

Sequence listing

SEQUENCE LISTING

<110> Robinson et al.

<120> PROTEINS INVOLVED IN SIGNAL TRANSDUCTION

<130> P035883WO

<140> PCT/GB2004/004775

<141> 2004-11-10

<150> GB 0326192.2

<151> 2003-11-10

<160> 16

<170> Seqwin99, version 1.02

<210> 1

<211> 11

<212> PRT

<213> Artificial Sequence

<220>

<223> Consensus sequence

<400> 1

Thr Cys Asn Asn Asn Lys Asp Ile Asn Gln Cys

1 5 10

<210> 2

<211> 260

<212> PRT

<213> Aeromonas salmonicida

<400> 2

Met Lys Gln Asp Gln Leu Leu Glu Tyr Leu Glu His Phe Thr Ser Val

1 5 10 15

Thr Asp Gly Asp Arg Leu Ala Glu Leu Ile Gly Arg Phe Thr Leu Gly

20 25 30

Met Gly Tyr Asp Tyr Tyr Arg Phe Ala Leu Ile Ile Pro Met Ser Met

35 40 45

Gln Arg Pro Lys Val Val Leu Phe Asn Gln Cys Pro Asp Ser Trp Val

50 55 60

Gln Ala Tyr Thr Ala Asn His Met Leu Ala Cys Asp Pro Ile Ile Gln

65 70 75 80

Leu Ala Arg Lys Gln Thr Leu Pro Ile Tyr Trp Asn Arg Leu Asp Glu

85 90 95

Arg Ala Arg Phe Leu Gln Glu Gly Ser Leu Asp Val Met Gly Leu Ala

100 105 110

Ala Glu Phe Gly Leu Arg Asn Gly Ile Ser Phe Pro Leu His Gly Ala

115 120 125

Ala Gly Glu Asn Gly Ile Leu Ser Phe Ile Thr Ala Glu Arg Ala Ser

130 135 140

Sequence listing

Ser Asp Leu Leu Leu Glu Ser Ser Pro Ile Leu Ser Trp Met Ser Asn
 145 150 155 160
 Tyr Ile Phe Glu Ala Ala Ile Arg Ile Val Arg Val Ser Leu Arg Glu
 165 170 175
 Asp Asp Pro Gln Glu Ala Leu Thr Asp Arg Glu Thr Glu Cys Leu Phe
 180 185 190
 Trp Ala Ser Glu Gly Lys Thr Ser Gly Glu Ile Ala Cys Ile Leu Gly
 195 200 205
 Ile Thr Glu Arg Thr Val Asn Tyr His Leu Asn Gln Val Thr Arg Lys
 210 215 220
 Thr Gly Ser Met Asn Arg Tyr Gln Ala Ile Ala Lys Gly Val Ser Ser
 225 230 235 240
 Gly Ile Leu Leu Pro Asn Leu Glu Gln Val Val Val Thr Asn Phe Pro
 245 250 255
 Lys Leu Met Gln
 260
 <210> 3
 <211> 241
 <212> PRT
 <213> Pseudomonas aeruginosa
 <400> 3
 Met Arg Asn Asp Gly Gly Phe Leu Leu Trp Trp Asp Gly Leu Arg Ser
 1 5 10 15
 Glu Met Gln Pro Ile His Asp Ser Gln Gly Val Phe Ala Val Leu Glu
 20 25 30
 Lys Glu Val Arg Arg Leu Gly Phe Asp Tyr Tyr Ala Tyr Gly Val Arg
 35 40 45
 His Thr Ile Pro Phe Thr Arg Pro Lys Thr Glu Val His Gly Thr Tyr
 50 55 60
 Pro Lys Ala Trp Leu Glu Arg Tyr Gln Met Gln Asn Tyr Gly Ala Val
 65 70 75 80
 Asp Pro Ala Ile Leu Asn Gly Leu Arg Ser Ser Glu Met Val Val Trp
 85 90 95
 Ser Asp Ser Leu Phe Asp Gln Ser Arg Met Leu Trp Asn Glu Ala Arg
 100 105 110
 Asp Trp Gly Leu Cys Val Gly Ala Thr Leu Pro Ile Arg Ala Pro Asn
 115 120 125
 Asn Leu Leu Ser Val Leu Ser Val Ala Arg Asp Gln Gln Asn Ile Ser
 130 135 140
 Ser Phe Glu Arg Glu Glu Ile Arg Leu Arg Leu Cys Met Ile Glu
 145 150 155 160
 Leu Leu Thr Gln Lys Leu Thr Asp Leu Glu His Pro Met Leu Met Ser
 165 170 175

Sequence listing

Asn Pro Val Cys Leu Ser His Arg Glu Arg Glu Ile Leu Gln Trp Thr
 180 185 190
 Ala Asp Gly Lys Ser Ser Gly Glu Ile Ala Ile Ile Leu Ser Ile Ser
 195 200 205
 Glu Ser Thr Val Asn Phe His His Lys Asn Ile Gln Lys Lys Phe Asp
 210 215 220
 Ala Pro Asn Lys Thr Leu Ala Ala Ala Tyr Ala Ala Ala Leu Gly Leu
 225 230 235 240
 Ile

<210> 4
 <211> 241
 <212> PRT
 <213> Pseudomonas chlororaphis

<400> 4
 Met Glu Leu Gly Gln Gln Leu Gly Trp Asp Ala Tyr Phe Tyr Ser Ile
 1 5 10
 Phe Ala Arg Thr Met Asp Met Gln Glu Phe Thr Ala Val Ala Leu Arg
 20 25 30
 Ala Leu Arg Glu Leu Arg Phe Asp Phe Phe Arg Tyr Gly Met Cys Ser
 35 40 45
 Val Thr Pro Phe Met Arg Pro Arg Thr Tyr Met Tyr Gly Asn Tyr Pro
 50 55 60
 Glu Asp Trp Val Gln Arg Tyr Gln Ala Ala Asn Tyr Ala Val Ile Asp
 65 70 75 80
 Pro Thr Val Lys His Ser Lys Val Ser Ser Pro Ile Leu Ala Ser
 85 90 95
 Asn Glu Leu Phe Arg Gly Cys Pro Asp Leu Trp Ser Glu Ala Asn Asp
 100 105 110
 Ser Asn Leu Arg His Gly Leu Ala Gln Pro Ser Phe Asn Thr Gln Gly
 115 120 125
 Arg Val Gly Val Leu Ser Leu Ala Arg Lys Asp Asn Pro Ile Ser Leu
 130 135 140
 Gln Glu Phe Glu Ala Leu Lys Val Val Thr Lys Ala Phe Ala Ala Ala
 145 150 155 160
 Val His Glu Lys Ile Ser Glu Leu Glu Ser Asp Val Arg Val Phe Asn
 165 170 175
 Thr Asp Val Glu Phe Ser Gly Arg Glu Cys Asp Val Leu Arg Trp Thr
 180 185 190
 Ala Asp Gly Lys Thr Ser Glu Glu Ile Gly Val Ile Met Gly Val Cys
 195 200 205
 Thr Asp Thr Val Asn Tyr His His Arg Asn Ile Gln Arg Lys Ile Gly
 210 215 220

Sequence listing

Ala Ser Asn Arg Val Gln Ala Ser Arg Tyr Ala Val Ala Met Gly Tyr
225 230 235 240

Ile

<210> 5
<211> 250
<212> PRT
<213> *Vibrio fischeri*

<400> 5
Met Lys Asn Ile Asn Ala Asp Asp Thr Tyr Arg Ile Ile Asn Lys Ile
1 5 10 15
Lys Ala Cys Arg Ala Tyr Asp Ile Asn Gln Cys Leu Ser Asp Met Thr
20 25 30
Lys Met Val His Cys Glu Tyr Tyr Leu Thr Leu Ala Ile Ile Tyr Pro
35 40 45
His Ser Met Val Lys Ser Asp Ile Ser Ile Leu Asn Tyr Pro Lys
50 55 60
Lys Trp Arg Gln Tyr Tyr Asp Asp Ala Asn Leu Ile Lys Tyr Asp Pro
65 70 75 80
Ile Val Asp Tyr Ser Asn Ser Asn His Ser Pro Ile Asn Trp Asn Ile
85 90 95
Phe Glu Asn Asn Ala Val Asn Lys Lys Ser Pro Asn Val Ile Lys Glu
100 105 110
Ala Lys Thr Ser Gly Leu Ile Thr Gly Phe Ser Phe Pro Ile His Thr
115 120 125
Ala Asn Asn Gly Phe Gly Met Leu Ser Phe Ala His Ser Glu Lys Asp
130 135 140
Asn Tyr Ile Asp Ser Leu Phe Leu His Ala Cys Met Asn Ile Pro Leu
145 150 155 160
Ile Val Pro Ser Leu Val Asp Asn Tyr Arg Lys Ile Asn Ile Ala Asn
165 170 175
Asn Lys Ser Asn Asn Asp Leu Thr Lys Arg Glu Lys Glu Cys Leu Ala
180 185 190
Trp Ala Cys Glu Gly Lys Ser Ser Trp Asp Ile Ser Lys Ile Leu Gly
195 200 205
Cys Ser Glu Arg Thr Val Thr Phe His Leu Thr Asn Ala Gln Met Lys
210 215 220
Leu Asn Thr Thr Asn Arg Cys Gln Ser Ile Ser Lys Ala Ile Leu Thr
225 230 235 240
Gly Ala Ile Asp Cys Pro Tyr Phe Lys Asn
245 250

<210> 6
<211> 249
<212> PRT

Sequence listing

<213> Pantoea stewartii

<400>

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6
Met Phe Ser Phe Phe Leu Glu Asn Gln Thr Ile Thr Asp Thr Leu Gln
1 5 10
Thr Tyr Ile Gln Arg Lys Leu Ser Pro Leu Gly Ser Pro Asp Tyr Ala
20 25 30
Tyr Thr Val Val Ser Lys Lys Asn Pro Ser Asn Val Leu Ile Ile Ser
35 40 45
Ser Tyr Pro Asp Glu Trp Ile Arg Leu Tyr Arg Ala Asn Asn Phe Gln
50 55 60
Leu Thr Asp Pro Val Ile Leu Thr Ala Phe Lys Arg Thr Ser Pro Phe
65 70 75 80
Ala Trp Asp Glu Asn Ile Thr Leu Met Ser Asp Leu Arg Phe Thr Lys
85 90 95
Ile Phe Ser Leu Ser Lys Gln Tyr Asn Ile Val Asn Gly Phe Thr Tyr
100 105 110
Val Leu His Asp His Met Asn Asn Leu Ala Leu Leu Ser Val Ile Ile
115 120 125
Lys Gly Asn Asp Gln Thr Ala Leu Glu Gln Arg Leu Ala Ala Glu Gln
130 135 140
Gly Thr Met Gln Met Leu Leu Ile Asp Phe Asn Glu Gln Met Tyr Arg
145 150 155 160
Leu Ala Gly Thr Glu Gly Glu Arg Ala Pro Ala Leu Asn Gln Ser Ala
165 170 175
Asp Lys Thr Ile Phe Ser Ser Arg Glu Asn Glu Val Leu Tyr Trp Ala
180 185 190
Ser Met Gly Lys Thr Tyr Ala Glu Ile Ala Ala Ile Thr Gly Ile Ser
195 200 205
Val Ser Thr Val Lys Phe His Ile Lys Asn Val Val Val Lys Leu Gly
210 215 220
Val Ser Asn Ala Arg Gln Ala Ile Arg Leu Gly Val Glu Leu Asp Leu
225 230 235 240
Ile Arg Pro Ala Ala Ser Ala Ala Arg
245

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<210>

7

<211>

245

<212>

PRT

<213>

Pectobacterium carotovorum

<400>

7

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Met Ser Gln Leu Phe Tyr Asn Asn Glu Thr Ile Ser Arg Ile Ile Lys
1 5 10
Ser Gln Phe Asp Met Ala Leu Ser His Tyr Gly Asp Ile Lys Tyr Ala
20 25 30

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Sequence listing

Tyr Met Val Leu Asn Lys Lys Lys Pro Thr Glu Ile Leu Ile Ile Ser
 35 40 45
 Asn His His Asp Glu Trp Arg Glu Ile Tyr Gln Ala Asn Asn Tyr Gln
 50 55 60
 His Ile Asp Pro Val Val Ile Ala Ala Leu Asn Lys Ile Thr Pro Phe
 65 70 75 80
 Pro Trp Asp Glu Asp Leu Leu Val Ser Thr Gln Leu Lys Met Ser Lys
 85 90 95
 Ile Phe Asn Leu Ser Arg Glu His Asn Ile Thr Asn Gly Tyr Thr Phe
 100 105 110
 Val Leu His Asp His Ser Asn Asn Leu Val Met Leu Ser Ile Met Ile
 115 120 125
 Asp Glu Ser Asn Val Ser Asn Ile Asp Asp Val Ile Glu Ser Asn Lys
 130 135 140
 Asp Lys Leu Gln Met Thr Leu Met Thr Ile His Ala Glu Thr Ile Ser
 145 150 155 160
 Leu Tyr Arg Glu Met Ile Arg Asn Lys Glu Asp Glu Arg Ser Asn Asp
 165 170 175
 Lys Asp Ile Phe Ser Gln Arg Glu Asn Glu Ile Leu Tyr Trp Ala Ser
 180 185 190
 Met Gly Lys Thr Tyr Gln Glu Ile Ala Leu Ile Leu Asp Ile Lys Thr
 195 200 205
 Gly Thr Val Lys Phe His Ile Gly Asn Val Val Lys Lys Leu Gly Val
 210 215 220
 Leu Asn Ala Lys His Ala Ile Arg Leu Gly Ile Glu Leu Gln Leu Ile
 225 230 235 240
 Arg Pro Val Gln Ser
 245
 <210> 8
 <211> 244
 <212> PRT
 <213> Yersinia enterocolitica
 <400> 8
 Met Ile Ile Asp Tyr Phe Asp Asn Glu Ser Ile Asn Glu Asp Ile Lys
 1 5 10 15
 Asn Tyr Ile Gln Arg Arg Ile Lys Thr Tyr Gly Asp Leu Cys Tyr Ser
 20 25 30
 Tyr Leu Val Met Asn Lys Lys Thr Pro Leu His Pro Thr Ile Ile Ser
 35 40 45
 Asn Tyr Pro Leu Asp Trp Val Lys Lys Tyr Lys Lys Asn Ser Tyr His
 50 55 60
 Leu Ile Asp Pro Val Ile Leu Thr Ala Lys Asp Lys Val Ala Pro Phe
 65 70 75 80

Sequence listing

Ala Trp Asp Asp Asn Ser Val Ile Asn Lys Lys Ser Thr Asp Ser Ala
85 90 95
Val Phe Lys Leu Ala Arg Glu Tyr Asn Ile Val Asn Gly Tyr Thr Phe
100 105 110
Val Leu His Asp Asn Ser Asn Asn Met Ala Thr Leu Asn Ile Ser Asn
115 120 125
Gly Ser Asp Asp Ser Ile Ser Phe Asp Glu Arg Ile Glu Ile Asn Lys
130 135 140
Glu Lys Ile Gln Met Leu Leu Ile Ile Thr His Glu Lys Met Leu Gly
145 150 155 160
Leu Tyr Gln Ser Asn Ser Asp Lys Asn Glu Asn Arg Asn Thr Gln Ile
165 170 175
Glu Arg Asp Ile Phe Ser Pro Arg Glu Asn Glu Ile Leu Tyr Trp Ala
180 185 190
Ser Val Gly Lys Thr Tyr Ala Glu Ile Ser Ile Ile Leu Gly Ile Lys
195 200 205
Arg Ser Thr Val Lys Phe His Ile Gly Asn Val Val Arg Lys Leu Gly
210 215 220
Val Leu Asn Ala Lys His Ala Ile Arg Leu Gly Ile Glu Leu Lys Leu
225 230 235 240
Ile Lys Pro Ile

<210> 9
<211> 234
<212> PRT
<213> Agrobacterium tumefaciens

<400> 9
Met Gln His Trp Leu Asp Lys Leu Thr Asp Leu Ala Ala Ile Glu Gly
1 5 10 15
Asp Glu Cys Ile Leu Lys Thr Gly Leu Ala Asp Ile Ala Asp His Phe
20 25 30
Gly Phe Thr Gly Tyr Ala Tyr Leu His Ile Gln His Arg His Ile Thr
35 40 45
Ala Val Thr Asn Tyr His Arg Gln Trp Gln Ser Thr Tyr Phe Asp Lys
50 55 60
Lys Phe Glu Ala Leu Asp Pro Val Val Lys Arg Ala Arg Ser Arg Lys
65 70 75 80
His Ile Phe Thr Trp Ser Gly Glu His Glu Arg Pro Thr Leu Ser Lys
85 90 95
Asp Glu Arg Ala Phe Tyr Asp His Ala Ser Asp Phe Gly Ile Arg Ser
100 105 110
Gly Ile Thr Ile Pro Ile Lys Thr Ala Asn Gly Phe Met Ser Met Phe
115 120 125

Sequence listing

Thr Met Ala Ser Asp Lys Pro Val Ile Asp Leu Asp Arg Glu Ile Asp
 130 135 140
 Ala Val Ala Ala Ala Thr Ile Gly Gln Ile His Ala Arg Ile Ser
 145 150 155
 Phe Leu Arg Thr Thr Pro Thr Ala Glu Asp Ala Ala Trp Leu Asp Pro
 165 170 175
 Lys Glu Ala Thr Tyr Leu Arg Trp Ile Ala Val Gly Lys Thr Met Glu
 180 185 190
 Glu Ile Ala Asp Val Glu Gly Val Lys Tyr Asn Ser Val Arg Val Lys
 195 200 205
 Leu Arg Glu Ala Met Lys Arg Phe Asp Val Arg Ser Lys Ala His Leu
 210 215 220
 Thr Ala Leu Ala Ile Arg Arg Lys Leu Ile
 225 230
 <210> 10
 <211> 236
 <212> PRT
 <213> Rhizobium spp.
 <400> 10
 Met Ser Val Asn Gly Asn Leu Arg Ser Leu Ile Asp Met Leu Glu Ala
 1 5 10
 Ala Gln Asp Gly His Met Ile Lys Ile Ala Leu Arg Ser Phe Ala His
 20 25 30
 Ser Cys Gly Tyr Asp Arg Phe Ala Tyr Leu Gln Lys Asp Gly Thr Gln
 35 40 45
 Val Arg Thr Phe His Ser Tyr Pro Gly Pro Trp Glu Ser Ile Tyr Leu
 50 55 60
 Gly Ser Asp Tyr Phe Asn Ile Asp Pro Val Leu Ala Glu Ala Lys Arg
 65 70 75 80
 Arg Arg Asp Val Phe Phe Trp Thr Ala Asp Ala Trp Pro Ala Arg Gly
 85 90 95
 Ser Ser Pro Leu Arg Arg Phe Arg Asp Glu Ala Ile Ser His Gly Ile
 100 105 110
 Arg Cys Gly Val Thr Ile Pro Val Glu Gly Ser Tyr Gly Ser Ala Met
 115 120 125
 Met Leu Thr Phe Ala Ser Pro Glu Arg Lys Val Asp Ile Ser Gly Val
 130 135 140
 Leu Asp Pro Lys Lys Ala Val Gln Leu Leu Met Met Val His Tyr Gln
 145 150 155 160
 Leu Lys Ile Ile Ala Ala Lys Thr Val Leu Asn Pro Lys Gln Met Leu
 165 170 175
 Ser Pro Arg Glu Met Leu Cys Leu Val Trp Ala Ser Lys Gly Lys Thr
 180 185 190

Sequence listing

Ala Ser Val Thr Ala Asn Leu Thr Gly Ile Asn Ala Arg Thr Val Gln
 195 200 205

His Tyr Leu Asp Lys Ala Arg Ala Lys Leu Asp Ala Glu Ser Val Pro
 210 215 220

Gln Leu Val Ala Ile Ala Lys Asp Arg Gly Leu Val
 225 230 235

<210> 11
 <211> 240
 <212> PRT
 <213> Listonella anguillarum

<400> 11
 Met Tyr Lys Ile Leu Arg Leu Ile Gln Glu Asn Gln Gln Ile Thr Ser
 1 5 10 15

His Asp Asp Leu Glu Asn Val Leu Asn Gly Leu Asn Asn Leu Ile Gly
 20 25 30

His Glu Phe Phe Leu Phe Gly Leu Ser Phe Gln Pro Thr Leu Lys Thr
 35 40 45

Ser Glu Thr Leu Val Thr Asp Asn Tyr Pro Asn Ser Trp Arg Gln Gln
 50 55 60

Tyr Asp Glu Ser Gly Phe Met His Ile Asp Pro Ile Val Lys Tyr Ser
 65 70 75 80

Ile Thr Asn Phe Leu Pro Ile Arg Trp Asp Ala Lys Arg Val Asn
 85 90 95

Asn Asp Gly Arg Val Ile Phe Glu Glu Ala Arg Cys Asn Gly Leu Lys
 100 105 110

Ala Gly Phe Ser Ile Pro Ile His Gly Leu Arg Gly Glu Phe Gly Met
 115 120 125

Ile Ser Phe Ala Thr Ser Asp Thr Lys Ser Tyr Asp Leu Asn Gln Gln
 130 135 140

Ser Ile His Thr Ser Gln Leu Ile Val Pro Leu Leu Ala His Asn Ile
 145 150 155 160

Gly Asn Ile Thr Arg Tyr His Lys Asp Ala Lys Pro Arg Ala Val Leu
 165 170 175

Thr Ala Arg Glu Val Gln Cys Leu Ala Trp Ala Ala Glu Gly Lys Ser
 180 185 190

Ala Trp Glu Ile Ala Thr Ile Ile Asn Thr Ser Glu Arg Thr Val Lys
 195 200 205

Phe His Phe Ser Asn Ala Cys Lys Lys Leu Gly Ala Thr Asn Arg Tyr
 210 215 220

Gln Ala Ile Thr Lys Ala Ile Leu Gly Gly Tyr Ile Asn Pro Tyr Leu
 225 230 235 240

<210> 12
 <211> 239

Sequence listing

<212> PRT
 <213> *Pseudomonas aeruginosa*

<400> 12
 Met Ala Leu Val Asp Gly Phe Leu Glu Leu Glu Arg Ser Ser Gly Lys
 1 5 10 15
 Leu Glu Trp Ser Ala Ile Leu Gln Lys Met Ala Ser Asp Leu Gly Phe
 20 25 30
 Ser Lys Ile Leu Phe Gly Leu Leu Pro Lys Asp Ser Gln Asp Tyr Glu
 35 40 45
 Asn Ala Phe Ile Val Gly Asn Tyr Pro Ala Ala Trp Arg Glu His Tyr
 50 55 60
 Asp Arg Ala Gly Tyr Ala Arg Val Asp Pro Thr Val Ser His Cys Thr
 65 70 75 80
 Gln Ser Val Leu Pro Ile Phe Trp Glu Pro Ser Ile Tyr Gln Thr Arg
 85 90 95
 Lys Gln His Glu Phe Phe Glu Glu Ala Ser Ala Ala Gly Leu Val Tyr
 100 105 110
 Gly Leu Thr Met Pro Leu His Gly Ala Arg Gly Glu Leu Gly Ala Leu
 115 120 125
 Ser Leu Ser Val Glu Ala Glu Asn Arg Ala Glu Ala Asn Arg Phe Ile
 130 135 140
 Glu Ser Val Leu Pro Thr Leu Trp Met Leu Lys Asp Tyr Ala Leu Gln
 145 150 155 160
 Ser Gly Ala Gly Leu Ala Phe Glu His Pro Val Ser Lys Pro Val Val
 165 170 175
 Leu Thr Ser Arg Glu Lys Glu Val Leu Gln Trp Cys Ala Ile Gly Lys
 180 185 190
 Thr Ser Trp Glu Ile Ser Val Ile Cys Asn Cys Ser Glu Ala Asn Val
 195 200 205
 Asn Phe His Met Gly Asn Ile Arg Arg Lys Phe Gly Val Thr Ser Arg
 210 215 220
 Arg Val Ala Ala Ile Met Ala Val Asn Leu Gly Leu Ile Thr Leu
 225 230 235

<210> 13
 <211> 233
 <212> PRT
 <213> *Rhodobacter sphaeroides*

<400> 13
 Met Asp Ile Ile Asp Leu Ser Thr Val Ala Thr Asp Asp Ala Ser Phe
 1 5 10 15
 Leu Asp Tyr Ile Asp Gln Leu Cys Gln Lys Leu Gly Phe Asp Tyr Ala
 20 25 30
 Ser Tyr Ala Thr Thr Ser Pro Met Thr Gly Ala Val Gln Gly Tyr Ala
 35 40 45

Sequence listing

Asn Tyr Pro Asp Ser Trp Lys Met His Tyr Met Arg Asn Leu His
 50 55 60
 Arg Val Asp Pro Thr Ile His Lys Ser Ala Leu Ser Ile Ala Pro Val
 65 70 75 80
 Asp Trp Ser Arg Phe Glu Arg Asp Glu Arg Phe Arg Ala Val Phe Phe
 85 90 95
 Ala Ala Glu Asp Phe Gly Ile Thr Pro Gln Gly Leu Thr Val Pro Val
 100 105 110
 Arg Gly Pro Tyr Gly Asp Arg Gly Leu Leu Ser Val Thr Arg Asn Cys
 115 120 125
 Ala Arg Pro Glu Trp Glu Lys His Lys Arg Ala Val Ile Gly Glu Leu
 130 135 140
 Gln Val Ala Ala Val His Leu His Asp Ala Val Met Arg Ser Asp Val
 145 150 155 160
 Ile Ser Arg Ala Leu Arg Gln Pro Arg Leu Ser Thr Arg Glu Ile Glu
 165 170 175
 Val Leu Gln Trp Ala Ala Ala Gly Lys Ser Gln Thr Asp Ile Gly Asp
 180 185 190
 Ile Leu Gly Ile Ser His Arg Thr Val Glu Val His Leu Arg Ser Ala
 195 200 205
 Arg Glu Lys Leu Gly Thr Leu Ser Thr Val Gln Ala Val Gly Arg Ala
 210 215 220
 Ile Gly Leu Gly Leu Val Tyr Pro Arg
 225 230
 <210> 14
 <211> 247
 <212> PRT
 <213> Rhizobium leguminosarum
 <400> 14
 Val Lys Glu Glu Ser Ser Ala Val Ser Asn Leu Val Phe Asp Phe Leu
 1 5 10 15
 Ser Glu Ser Ala Ser Ala Lys Ser Lys Asp Asp Val Leu Leu Phe
 20 25 30
 Gly Lys Ile Ser Gln Tyr Phe Gly Phe Ser Tyr Phe Ala Ile Ser Gly
 35 40 45
 Ile Pro Ser Pro Ile Glu Arg Ile Asp Ser Tyr Phe Val Leu Gly Asn
 50 55 60
 Trp Ser Val Gly Trp Phe Asp Arg Tyr Arg Glu Asn Asn Tyr Val His
 65 70 75 80
 Ala Asp Pro Ile Val His Leu Ser Lys Thr Cys Asp His Ala Phe Val
 85 90 95
 Trp Ser Glu Ala Leu Arg Asp Gln Lys Leu Asp Arg Gln Ser Arg Arg
 100 105 110

Sequence listing

Val Met Asp Glu Ala Arg Glu Phe Lys Leu Ile Asp Gly Phe Ser Val
115 120 125
Pro Leu His Thr Ala Ala Gly Phe Gln Ser Ile Val Ser Phe Gly Ala
130 135 140
Glu Lys Val Glu Leu Ser Thr Cys Asp Arg Ser Ala Leu Tyr Leu Met
145 150 155 160
Ala Ala Tyr Ala His Ser Leu Leu Arg Ala Gln Ile Gly Asn Asp Ala
165 170 175
Ser Arg Lys Ile Gln Ala Leu Pro Met Ile Thr Thr Arg Glu Arg Glu
180 185 190
Ile Ile His Trp Cys Ala Ala Gly Lys Thr Ala Ile Glu Ile Ala Thr
195 200 205
Ile Leu Gly Arg Ser His Arg Thr Ile Gln Asn Val Ile Leu Asn Ile
210 215 220
Gln Arg Lys Leu Asn Val Val Asn Thr Pro Gln Met Ile Ala Glu Ser
225 230 235 240
Phe Arg Leu Arg Ile Ile Arg
245

<210> 15
<211> 242
<212> PRT
<213> Rhizobium etli

<400> 15
Met Ser Pro Ser His Ala Glu Gln Phe Ser Phe Phe Leu Leu Ser Gly
1 5 10
Pro Asp Leu Arg Ile Ala Asp Ile Ala Gly Ser Gly Asn Asp Ala Gly
20 25 30
Arg Ser Arg Pro His Leu Cys Asp Ile Ala Tyr Gly Ser Pro Cys Asp
35 40 45
Leu Ala Gly Ala Thr Asp Ser Asn Pro Leu Leu Met Leu Thr Tyr Pro
50 55 60
Pro Glu Trp Val Lys Gln Tyr Arg Asp Arg Asp Tyr Phe Ser Ile Asp
65 70 75 80
Pro Val Val Arg Leu Gly Arg Arg Gly Phe Leu Pro Val Glu Trp Ser
85 90 95
Ala Ser Gly Trp Asp Ser Gly Arg Ala Tyr Gly Phe Phe Lys Glu Ala
100 105 110
Met Ala Phe Gly Val Gly Arg Gln Gly Val Thr Leu Pro Val Arg Gly
115 120 125
Pro Gln Gly Glu Arg Ser Leu Phe Thr Val Thr Ser Asn His Pro Asp
130 135 140
Ala Tyr Trp Arg Gln Phe Arg Met Asp Ser Met Arg Asp Leu Gln Phe
145 150 155 160

Sequence listing

Leu Ala His His Leu His Asp Arg Ala Met Val Leu Ser Gly Met Arg
165 170 175
Lys Val Ala Asp Leu Pro Arg Leu Ser Arg Arg Glu Leu Gln Cys Leu
180 185 190
Glu Met Thr Ala Asn Gly Leu Leu Ala Lys Gln Ile Cys Ala Arg Leu
195 200 205
Ser Ile Ser Val Ser Ala Val Gln Leu Tyr Leu Ala Ser Ala Arg Arg
210 215 220
Lys Leu Thr Val Ala Thr Thr Ser Glu Gln Leu Leu Gly Pro Arg Arg
225 230 235 240
Ser Asn

<210> 16
<211> 241
<212> PRT
<213> Escherichia coli

<400> 16
Met Gln Asp Lys Asp Phe Phe Ser Trp Arg Arg Thr Met Leu Arg
1 5 10 15
Phe Gln Arg Met Glu Thr Ala Glu Glu Val Tyr His Glu Ile Glu Leu
20 25 30
Gln Ala Gln Gln Leu Glu Tyr Asp Tyr Tyr Ser Leu Cys Val Arg His
35 40 45
Pro Val Pro Phe Thr Arg Pro Lys Val Ala Phe Tyr Thr Asn Tyr Pro
50 55 60
Glu Ala Trp Val Ser Tyr Tyr Gln Ala Lys Asn Phe Leu Ala Ile Asp
65 70 75 80
Pro Val Leu Asn Pro Glu Asn Phe Ser Gln Gly His Leu Met Trp Asn
85 90 95
Asp Asp Leu Phe Ser Glu Ala Gln Pro Leu Trp Glu Ala Ala Arg Ala
100 105 110
His Gly Leu Arg Arg Gly Val His Ser Val Phe Asn Ala Ala Gln Thr
115 120 125
Gly Ala Leu Gly Phe Leu Ser Phe Ser Arg Cys Ser Arg Arg Glu Ile
130 135 140
Pro Ile Leu Ser Asp Glu Leu Gln Leu Lys Met Gln Leu Leu Val Arg
145 150 155 160
Glu Ser Leu Met Ala Leu Met Arg Leu Asn Asp Glu Ile Val Met Thr
165 170 175
Pro Glu Met Asn Phe Ser Lys Arg Glu Lys Glu Ile Leu Arg Trp Thr
180 185 190
Ala Glu Gly Lys Thr Ser Ala Glu Ile Ala Met Ile Leu Ser Ile Ser
195 200 205

Sequence listing

Glu Asn Thr Val Asn Phe His Gln Lys Asn Met Gln Lys Lys Ile Asn
 210 215 220

Ala Pro Asn Lys Thr Gln Val Ala Cys Tyr Ala Ala Ala Thr Gly Leu
 225 230 235 240

Ile